CLAIMS

What is claimed is:

1. Method of shaping a portion of an elongate element extending between an area of a substrate and a capillary of a wirebonder, characterized by:

urging a shaping tool against the portion of the elongate element to impart a shape to a portion of the elongate element.

2. Method, according to claim 1, characterized in that:

the elongate element is a wire.

3. Method, according to claim 1, characterized in that:

the area of the substrate is a terminal on an electronic component.

4. Method, according to claim 1, characterized in that:

the substrate is a sacrificial substrate.

5. Method, according to claim 1, characterized by:

in conjunction with shaping the elongate element, severing the shaped portion of the elongate element from a remaining portion of the elongate element.

6. Method, according to claim 5, characterized by:

severing the shaped portion of the elongate element from the remaining portion of the elongate element with a spark.

7. Method, according to claim 6, characterized in that:

the spark is provided by an electrode mounted to the shaping tool.

8. Method, according to claim 6, characterized in that:

the spark is provided by an electrode mounted in a

39. Method of mounting an interconnection element to a terminal of an electronic component, comprising:

attaching an elongate element of a first material to a terminal of an electronic component;

shaping the elongate element with a shaping tool; and

overcoating the elongate element with a second material which has a higher yield strength than the first material.

40. Method, according to claim 39, further comprising:

while overcoating the elongate element, overcoating at least a portion of an exposed surface of the terminal with the second material.

41. Method of performing wirebonding, comprising:

feeding a supply wire through a capillary;

bonding an end of the supply wire to an area on a surface of a substrate by urging the capillary against the surface of the substrate;

moving the capillary away from the surface of the substrate, thereby causing the supply wire to play out of the capillary and extend as a wire stem between the capillary and the surface of the substrate;

stopping the capillary at a distance above the surface of the substrate; and

after stopping the capillary, urging a shaping tool against the wire stem.

42. Method, according to claim 41, further comprising:

after urging the shaping tool against the wire stem, severing the wire stem at the capillary so that the wire stem is a free-standing wire stem and so that the supply wire has a new end.

fixed relationship to the capillary.

9. Method, according to claim 1, characterized by:

severing the elongate element with a cutting feature on the shaping tool.

10. Method, according to claim 5, characterized by:

creating a plurality of shaped elongate elements connected end-to-end by repeatedly urging the shaping tool against successive portions of the elongate element.

11. Method, according to claim 1, characterized in that:

the shaping tool is moved in a direction which is parallel to the substrate.

12. Method, according to claim 1, characterized in that:

the shaping tool is moved in a direction which is towards the substrate.

13. Method, according to claim 1, characterized by:

making an electrical connection between the elongate element and the shaping tool.

14. Method, according to claim 1, characterized by:

severing the elongate element adjacent the capillary with a spark from an electrode.

[redacted]. Wirebonding apparatus comprising:

a capillary capable of moving in a one direction to bond an end of a supply wire passing through the capillary to an area on a surface of a substrate, and capable of moving in an opposite direction so that an end portion of the wire extends between the substrate and the capillary;

characterized by:

a shaping tool, acting directly upon the end portion of the wire, for imparting a desired shape to the end portion of the wire.

16. Wirebonding apparatus, according to claim 15, characterized by:

means for urging the shaping tool against the end portion of the wire.

17. Wirebonding apparatus, according to claim 15, characterized by:

an EFO electrode mounted to the shaping tool.

18. Wirebonding apparatus, according to claim 15, characterized in that:

the shaping tool comprises an anvil and a die, said anvil being disposed on a one side of the end portion of the wire and said die being disposed on an opposite side of the end portion of the wire, said desired shape being imparted to the end portion of the wire when the anvil and die are moved towards one another with the end portion of the wire therebetween.

19. Wirebonding apparatus, according to claim 18, characterized by:

a feature on at least one of the anvil and die suitable for at least nicking the elongate element when the anvil and die are moved towards one another.

20. Wirebonding apparatus, according to claim 19, characterized in that:

the feature is suitable for completely severing the end portion of the wire from a remaining portion of the wire.

21. Method of making a composite interconnection element, comprising:

urging a shaping tool against an elongate core element so as to impart a springable shape to the core element; and

overcoating the core element with a material of sufficient thickness and of sufficient yield strength to impart a desired amount of resiliency to the resulting composite interconnection element and to dominate said resiliency.

22. Method, according to claim 21, further comprising:

prior to urging the shaping tool against the core element, bonding a one end of the core element to a terminal on an electronic component.

23. Method, according to claim 21, wherein:

the core element is a material selected from the group consisting of gold, copper, aluminum and their alloys.

24. Method, according to claim 21, wherein:

the shaped core element is overcoated with a material selected from the group consisting of nickel and its alloys.

25. Method, according to claim 21, wherein:

the core element has a thickness of 0.0003 - 0.0015 inches, as measured in a first axis.

26. Method, according to claim 25, wherein:

the core element has a thickness of 0.0010 - 0.0100 inches, as measured in a second axis orthogonal to the first axis.

27. Method, according to claim 21, wherein:

the core element has a non-circular cross-section.

28. Method of mounting an interconnection element to a terminal of an electronic component, comprising:

attaching a core element to a terminal of an electronic component;

shaping the core element with a shaping tool; and

overcoating the core element and at least an adjacent portion of the terminal with a material of sufficient thickness and of sufficient yield strength to securely mount the resulting composite interconnection element to the terminal, said overcoating material making a substantial contribution to anchoring the resulting interconnection element to the terminal.

29. Method, according to claim 28, wherein:

the core element is a material selected from the group consisting of gold, copper, aluminum and their alloys.

30. Method, according to claim 28, wherein:

the core element is overcoated with a material selected from the group consisting of nickel and its alloys.

31. Method, according to claim 28, wherein:

the core element has a thickness of 0.0003 - 0.0010 inches.

32. Method, according to claim 28, wherein:

the material overcoating the core element has a nominal thickness of less than 0.0010 inches.

. Method of fabricating interconnection elements, comprising:

mounting a plurality of core elements to a surface of a sacrificial substrate;

shaping the core elements with a shaping tool;

overcoating the core elements with at least one layer of at least one material; and

removing the sacrificial substrate.

Method of making an interconnection element for use in microelectronic applications, comprising:

providing a core element of a relatively soft material;

shaping the core element with a shaping tool; and

overcoating the core element with a shell of a relatively hard material.

35. Method, according to claim 34, wherein:

the core element is overcoated by a process selected from the group consisting of various processes involving deposition of materials out of aqueous solutions; electrolytic plating; electroless plating; chemical vapor deposition (CVD); physical vapor deposition (PVD); and processes causing the disintegration of liquids, solids or gases.

36. Method, according to claim 34, wherein:

the core element is a material selected from the group consisting of gold, copper, aluminum, and their alloys.

37. Method, according to claim 34, wherein:

the shell is a material selected from the group consisting of nickel and its alloys.

38. Method, according to claim 34, wherein:

the core element has a first yield strength;

the shell has a second yield strength; and

the second yield strength is at least twice the first yield strength.

43. Method, according to claim 42, wherein:

the wire stem is severed by a process of electronic flame off (EFO).

44. Method, according to claim 42, further comprising:

during severing the wire stem, forming a ball at the free end of the wire stem.

45. Method, according to claim 42, further comprising:

during severing the wire, forming a ball at the new end of the supply wire.

46. Method of severing an elongate element, comprising:

positioning an electrode adjacent the elongate element; and

causing an electrical discharge to occur between the electrode and the elongate element;

characterized in that:

prior to causing the electrical discharge, reducing the cross-section of the elongate element at a position whereat it is desired to sever the elongate element, thereby ensuring the location of said spark-severing.

47. Method, according to claim 46, characterized in that:

the elongate element is a wire.

48. Method, according to claim 46, characterized in that:

the elongate element is a core of a composite interconnection element.

49. Method, according to claim 46, characterized in that:

the elongate element is a ribbon-like wire.

50. Method of shaping an elongate element, comprising:

playing a portion of the elongate element from a capillary;

urging a shaping tool against the played-out portion of the elongate element; and

during urging the shaping tool against the played-out portion, moving the capillary.

51. Method, according to claim 50, characterized in that:

the elongate element is a wire.

52. Method, according to claim 50, characterized in that:

the elongate element is a core of a composite interconnection element.

53. Method, according to claim 50, characterized in that:

the elongate element is a ribbon-like wire.